Claims

1. A communications method for carrying out communications using a plurality of M signal points to be placed on an I-Q plane, characterized in that

when the M signal points are spaced on the I-Q plane around a point of origin to have a uniform space a in directions of an I-axis and a Q-axis, inside of a circle or inside of the circle covering over the circle having a radius of a space b between the point of origin and a point of the largest value in both directions of the I-axis and the Q-axis, the M signal points are placed in such a manner that a space between any two arbitrary signal points is equal to or larger than the uniform space a, and a space between at least a pair of signal points is larger than the uniform space a.

2. The communications method according to claim 1, characterized in that

the M signal points are placed over a plurality of circles on the I-Q plane around the point of origin, a radius of the respective circles is an integral multiple of a radius of the smallest circle, and the radius of the largest circle is the space b.

3. The communications method according to claim 2, characterized in that

on the respective circles, the signal points of the integral multiple of 4 are spaced uniformly to be symmetric

to the I-axis and the Q-axis.

4. A communications method for converting a signal point of a received signal into data corresponding to any of a plurality of M signal points to be placed on an I-Q plane, characterized in that

a determination is made for a level of the signal point of the received signal, and another determination is made for a phase of the signal point of the received signal on the I-Q plane, and the signal point of the received signal is converted into data equivalent to a value based on determination results.

5. A communications system for carrying out signal communications from a communications device at a transmission end to a communications device at a reception end using a plurality of M signal points to be placed on an I-Q plane, characterized in that

the communications device at the transmission end comprises: signal point conversion means for converting transmitting data into a signal point using a placement of signal points in which, when the M signal points are spaced on the I-Q plane around a point of origin to have a uniform space a in directions of an I-axis and a Q-axis, inside of a circle or inside of the circle covering over the circle having a radius of a space b between the point of origin and a point of the largest value in both directions of the I-axis and the Q-axis, the M signal points are placed in such a manner that a space

between any two arbitrary signal points is equal to or larger than the uniform space *a*, and a space between at least a pair of signal points is larger than the uniform space *a*; and

signal transmission means for transmitting a signal structured by the signal point as a result of conversion by the signal point conversion means, and

the communications device at the reception end comprises: signal reception means for signal reception;

signal point position determination means for making a determination for a position of the signal point of the received signal on the I-Q plane; and

data conversion means for converting the signal point of the received signal into data corresponding to a signal point to be identified based on a determination result by the signal point determination means.